[0039] What is claimed as new and desired to be protected by Letters Patent of the United States is:

1. A method of forming a coplanar waveguide comprising the acts of:

forming a signal conductor line over a substrate;

forming at least one longitudinal ground conductor plane over said substrate and on a side of said signal conductor line, said ground conductor plane being spaced from said signal conductor line; and

forming a trench in said substrate in an area between said at least one ground conductor plane and said signal conductor line.

2. The method of claim 1, wherein the acts of forming said signal conductor line and said ground conductor plane further comprise depositing an insulating layer on said substrate and depositing a conductive material on top of said insulating layer.

3. The method of claim 2, wherein said insulating layer is an oxide layer.

4. The method of claim 3 further comprising depositing a barrier layer on said oxide layer before depositing said conductive material.

5. The method of claim 4, wherein said conductive material is a metal layer, said method further comprising forming a silicide layer on sidewalls of said metal layer.

6. The method of claim 3, wherein said oxide layer is deposited to a thickness of about 200 Angstroms to about 300 Angstroms.

7. The method of claim 4, wherein said barrier layer is deposited to a thickness of about 50 Angstroms to about 100 Angstroms.

8. The method of claim 4, wherein said barrier layer comprises TiN.

9. The method of claim 2, wherein said conductive material is deposited to a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

10. The method of claim 2, wherein said conductive material comprises copper.

11. The method of claim 2 wherein said conductive material is deposited by thermal evaporation.

12. The method of claim 5, wherein said metal layer is exposed to silane to form said silicide layer.

13. The method of claim 12, wherein said metal layer is exposed to silane at 300^{0}C to form said silicide layer.

14. The method of claim 1, wherein said trench is etched to a depth of about 100,000 Angstroms to about 200,000 Angstroms.

15. The method of claim 1, wherein said trench is etched at a rate of about 2.2 μm/min.

16. The method of claim 1, wherein said ground conductor plane is spaced from said signal conductor line by about 150,000 Angstroms to about 200,000 Angstroms.

17. The method of claim 1, wherein said signal conductor line has a width of about 250,000 Angstroms to about 350,000 Angstroms.

18. The method of claim 1, wherein said ground conductor planes and signal conductor line has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

19. A method of forming a coplanar waveguide comprising the acts of:

forming a signal conductor line over a silicon substrate;

forming at least one longitudinal ground conductor plane over said substrate and on a side of said signal conductor line, said ground conductor plane being spaced from said signal conductor line; and

forming at least one trench in said silicon substrate in an area between said at least one ground conductor plane and said signal conductor line, said at least one trench having a depth of about 100,000 Angstroms to about 200,000 Angstroms and a width of about 100,000 Angstroms to about 150,000 Angstroms.

20. The method of claim 19, wherein the acts of forming said signal conductor line and said ground conductor plane further comprise depositing an oxide layer on said silicon substrate and depositing a copper layer on top of said oxide layer.

21. The method of claim 20 further comprising depositing a barrier layer on said oxide layer before depositing said copper layer.

22. The method of claim 20 further comprising forming a silicide layer on sidewalls of said copper layer.

23. The method of claim 20, wherein said oxide layer is deposited to a thickness of about 200 Angstroms to about 300 Angstroms.

24. The method of claim 21, wherein said barrier layer is deposited to a thickness of about 50 Angstroms to about 100 Angstroms.

25. The method of claim 21, wherein said barrier layer comprises TiN.

26. The method of claim 20, wherein said copper layer is deposited to a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

27. The method of claim 22, wherein said copper layer is exposed to silane to form said silicide layer.

28. The method of claim 27, wherein said copper layer is exposed to silane at 300^0C to form said silicide layer.

29. The method of claim 19, wherein said ground conductor plane is spaced from said signal conductor line by about 150,000 Angstroms to about 200,000 Angstroms.

30. The method of claim 19, wherein said signal conductor line has a width of about 250,000 Angstroms to about 350,000 Angstroms.

31. The method of claim 19, wherein said ground conductor planes and signal conductor line has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

32. A method of forming a coplanar waveguide comprising the acts of:

forming a signal conductor line over a silicon substrate;

forming at least one longitudinal ground conductor plane over said substrate and on a side of said signal conductor line, said ground conductor plane being spaced from said signal conductor line; and

forming at least one trench in said silicon substrate in an area between said at least one ground conductor plane and said signal conductor line, said at least one trench having a radius of about 50,000 Angstroms to about 100,000 Angstroms.

33. The method of claim 32, wherein the acts of forming said signal conductor line and said ground conductor plane further comprise depositing an oxide layer on said silicon substrate and depositing a copper layer on top of said oxide layer.

34. The method of claim 33 further comprising depositing a barrier layer on said oxide layer before depositing said copper layer.

35. The method of claim 34 further comprising forming a silicide layer on sidewalls of said copper layer.

36. The method of claim 33, wherein said oxide layer is deposited to a thickness of about 200 Angstroms to about 300 Angstroms.

37. The method of claim 34, wherein said barrier layer is deposited to a thickness of about 50 Angstroms to about 100 Angstroms.

38. The method of claim 34, wherein said barrier layer comprises TiN.

39. The method of claim 33, wherein said copper layer is deposited to a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

40. The method of claim 35, wherein said copper layer is exposed to silane to form said silicide layer.

41. The method of claim 41, wherein said copper layer is exposed to silane at 300^0C to form said silicide layer.

42. The method of claim 32, wherein said ground conductor plane is spaced from said signal conductor line by about 150,000 Angstroms to about 200,000 Angstroms.

43. The method of claim 32, wherein said signal conductor line has a width of about 250,000 Angstroms to about 350,000 Angstroms.

44. The method of claim 32, wherein said ground conductor planes and signal conductor line has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

45. A coplanar waveguide comprising:

a substrate;

a signal conductor line formed over said substrate;

at least two longitudinal ground conductor planes formed over said substrate on both sides of said signal conductor line and spaced apart from said signal conductor line to form respective gaps; and

at least two trenches formed in said substrate at said respective gaps.

46. The coplanar waveguide of claim 45, wherein said signal conductor line and said ground conductor planes further comprise an insulating layer on said substrate.

47. The coplanar waveguide of claim 46, wherein said insulating layer is an oxide layer.

48. The coplanar waveguide of claim 47, wherein said signal conductor line and said ground conductor planes further comprise a barrier layer on said oxide layer.

49. The coplanar waveguide of claim 48, wherein said signal conductor line and said ground conductor planes further comprise a conductive material on said barrier layer.

50. The coplanar waveguide of claim 49, wherein said signal conductor line and ground conductor planes further comprise silicon oxide on said conductive material.

51. The coplanar waveguide of claim 50, wherein said signal conductor line and said ground conductor planes comprise a silicide layer on exposed areas of said conductive material.

52. The coplanar waveguide of claim 47, wherein said oxide layer has a thickness of about 200 Angstroms to about 300 Angstroms.

53. The coplanar waveguide of claim 48, wherein said barrier layer has a thickness of about 50 Angstroms to about 100 Angstroms.

54. The coplanar waveguide of claim 48, wherein said barrier layer comprises TiN.

55. The coplanar waveguide of claim 49, wherein said conductive material has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

56. The coplanar waveguide of claim 49, wherein said conductive material comprises copper.

57. The coplanar waveguide of claim 45, wherein each of said at least two trenches has a depth of about 100,000 Ångstroms to about 200,000 Angstroms.

58. The coplanar waveguide of claim 45, wherein each of said respective gaps is about 150,000 Angstroms to about 200,000 Angstroms.

59. The coplanar waveguide of claim 45, wherein said signal conductor line has a width of about 250,000 Angstroms to about 350,000 Angstroms.

60. The coplanar waveguide of claim 45, wherein said ground conductor planes and said signal conductor line have a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

61. A processor system comprising:

a processor; and

an integrated circuit coupled to said processor, at least one of said integrated circuit and processor comprising a substrate, a signal conductor line formed over said substrate, at least two longitudinal ground conductor planes formed over said substrate and on both sides of said signal conductor line and

spaced apart from said signal conductor line to form respective gaps, and at least two trenches formed in said substrate at said respective gaps.

62. The system of claim 61, wherein said signal conductor line and said ground conductor planes comprise an insulating layer on said substrate and a conductor layer on top of said insulating layer.

63. The system of claim 62, wherein said insulating layer is an oxide layer.

64. The system of claim 63, wherein said signal conductor line and said ground conductor planes comprise a barrier layer on said oxide layer.

65. The system of claim 64, wherein said signal conductor line and said ground conductor planes comprise silicon oxide on said conductor layer.

66. The system of claim 65, wherein said signal conductor line and said ground conductor planes comprise a silicide layer on said silicon oxide layer.

67. The system of claim 65, wherein said oxide layer has a thickness of about 200 Angstroms to about 300 Angstroms.

68. The system of claim 64, wherein said barrier layer has a thickness of about 50 Angstroms to about 100 Angstroms.

69. The system of claim 64, wherein said barrier layer comprises TiN.

70. The system of claim 62, wherein said conductor layer has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

71. The system of claim 62, wherein said conductor layer comprises copper.

72. The system of claim 61, wherein each of said at least two trenches has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

73. The system of claim 61, wherein each of said respective gaps is of about 150,000 Angstroms to about 200,000 Angstroms.

74. The system of claim 61, wherein said signal conductor line has a width of about 250,000 Angstroms to about 350,000 Angstroms.

75. The system of claim 61, wherein said ground conductor planes and signal conductor line has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

76. A coplanar waveguide comprising:

a silicon substrate;

a signal conductor line formed over said silicon substrate;

at least two longitudinal ground conductor planes formed over said silicon substrate on both sides of said signal conductor line and spaced apart from said signal conductor line to form respective gaps; and

at least two trenches formed in said silicon substrate at said respective gaps, each of said trenches having a depth of about 100,000 Angstroms to about 200,000 Angstroms and a width of about 100,000 Angstroms to about 150,000 Angstroms.

77. The coplanar waveguide of claim 76, wherein said signal conductor line and said ground conductor planes further comprise an oxide layer on said silicon substrate.

78. The coplanar waveguide of claim 77, wherein said signal conductor line and said ground conductor planes further comprise a barrier layer on said oxide layer.

79. The coplanar waveguide of claim 78, wherein said signal conductor line and said ground conductor planes further comprise a copper layer on said barrier layer.

80. The coplanar waveguide of claim 79, wherein said signal conductor line and ground conductor planes further comprise silicon oxide on said copper layer.

81. The coplanar waveguide of claim 80, wherein said signal conductor line and said ground conductor planes comprise a silicide layer on exposed areas of said copper layer.

82. The coplanar waveguide of claim 78, wherein said barrier layer comprises TiN.

83. The coplanar waveguide of claim 79, wherein said copper layer has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.

84. A coplanar waveguide comprising:

a silicon substrate;

a signal conductor line formed over said silicon substrate;

at least two longitudinal ground conductor planes formed over said silicon substrate on both sides of said signal conductor line and spaced apart from said signal conductor line to form respective gaps; and

at least two trenches formed in said silicon substrate at said respective gaps, each of said trenches having a radius of about 50,000 Angstroms to about 100,000 Angstroms.

85. The coplanar waveguide of claim 84, wherein said signal conductor line and said ground conductor planes further comprise an oxide layer on said silicon substrate.

86. The coplanar waveguide of claim 85, wherein said signal conductor line and said ground conductor planes further comprise a barrier layer on said oxide layer.

87. The coplanar waveguide of claim 86, wherein said signal conductor line and said ground conductor planes further comprise a copper layer on said barrier layer.

88. The coplanar waveguide of claim 87, wherein said signal conductor line and ground conductor planes further comprise silicon oxide on said copper layer.

89. The coplanar waveguide of claim 87, wherein said signal conductor line and said ground conductor planes comprise a silicide layer on exposed areas of said copper layer.

90. The coplanar waveguide of claim 86, wherein said barrier layer comprises TiN.

91. The coplanar waveguide of claim 87, wherein said copper layer has a thickness of about 100,000 Angstroms to about 200,000 Angstroms.